

Within a few minutes, and at a time when I was about 1 mile west of the city, thunder became more violent. I noticed the cloud layer spreading rapidly in all directions, and there was a violent rush of cold wind from the west, followed within a few moments by a sprinkle of large raindrops. In the lower part of the city smoke was issuing freely from several power-plant and factory chimneys, and the course of the smoke leaving these chimneys in relation to the overlying cloud layer was something, as shown by the accompanying sketch. One smoke column, marked "A" in the sketch, in particular rose in a graceful parabolic line to a height apparently of 1,500 to 2,500 feet.

One can imagine the air near the surface becoming overheated during the afternoon, rushing upward, and spreading out at the cloud level, the upward course being marked roughly by the lines of smoke and the whole mass of air forming a solid shape very much like a flat-

topped mushroom. The sky was generally clear, and I encountered no rain in traveling 10 miles west of Albany.

During this trip I could look back eastward across the Hudson Valley and could see the back of a thunderstorm traveling eastward. The width of the rain belt was apparently not over 2 or 3 miles, judged from the known locations of adjacent hills.

After arriving at my home, and at least one hour after the storm started, at a time when the sky overhead was bright and clear, a sprinkle of large raindrops fell. The sky was clear from clouds everywhere, except far to the east, and it would appear that these raindrops may have been formed with the first uprush of air at Albany and had been slowly drifting westward with an upper air current, or with the spreading out of the mushroom top of the convective air column, finally being precipitated at least 9 miles from their place of origin.

#### TORNADOES OF APRIL 15, 1921, IN ARKANSAS AND TEXAS.

By W. C. HICKMON, Observer..

[Weather Bureau, Little Rock, Ark., Apr. 28, 1921.]

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##### SYNOPSIS.

During the afternoon and evening of April 15, 1921, four tornadoes occurred in Arkansas and Texas. The most destructive of these started in Texas, but most of the damage done by it was in Arkansas, so the Texas end of the path is discussed briefly in connection with the Arkansas storms. Fifty-six people were killed in these four tornadoes, and the property loss is estimated at about \$1,300,000.

##### PRECEDING AND ATTENDING WEATHER.

The morning weather map of April 15 showed high pressure over the central Canadian Provinces, a storm of marked intensity centered over southeastern Colorado, and moderate disturbances over the lower lakes and extreme southern Texas. Temperatures had risen during the preceding 24 hours throughout the South but from the upper lakes westward cooler weather prevailed. The 15th was a sultry day in Arkansas, the sky overcast most of the time, the humidity high, the maximum temperatures at stations in the southern half of the State ranging from 70° to 80° F. with thunderstorms general. The evening map (fig. 1, p. 255), showed that the Colorado storm had moved slightly southeastward to the Texas Panhandle, the southern Texas storm northeastward, the two joining in a lopsided low pressure area with two centers, the one with the longer axis centering over northeast Texas and southwest Arkansas, and along this northeast-southwest axis where cold northerly winds and warm southerly ones were meeting there occurred between 12:45 p. m. and 8:45 p. m. at least four tornadoes.

##### IN TEXAS.

Starting at Mineola, Wood County, Tex. (see fig. 1), at 12:45 p. m. with a funnel-shaped cloud, rotary winds, and a destructive path about 100 feet in width, the storm moved northeastward increasing in intensity and size, its path at Avinger, Cass County, at 2:30 p. m. varying from 400 to 600 yards in width. Here 8 people were killed, 14 seriously injured, and 30 slightly hurt. Continuing northeastward across the southeast corner of Bowie County, where two people were killed, the tornado crossed the Arkansas-Texas line at a point 8 miles south of Texarkana about 4 p. m.

##### IN ARKANSAS.

*Miller County.*—Continuing its northeastward movement the storm struck the Trigenta community where

four people were killed. At Shiloh, 7 miles east of Texarkana, two lives were lost and the schoolhouse in which Miss Lena Owens, home demonstration agent, was conducting a club meeting, collapsed on the 15 members, all escaping serious injury.

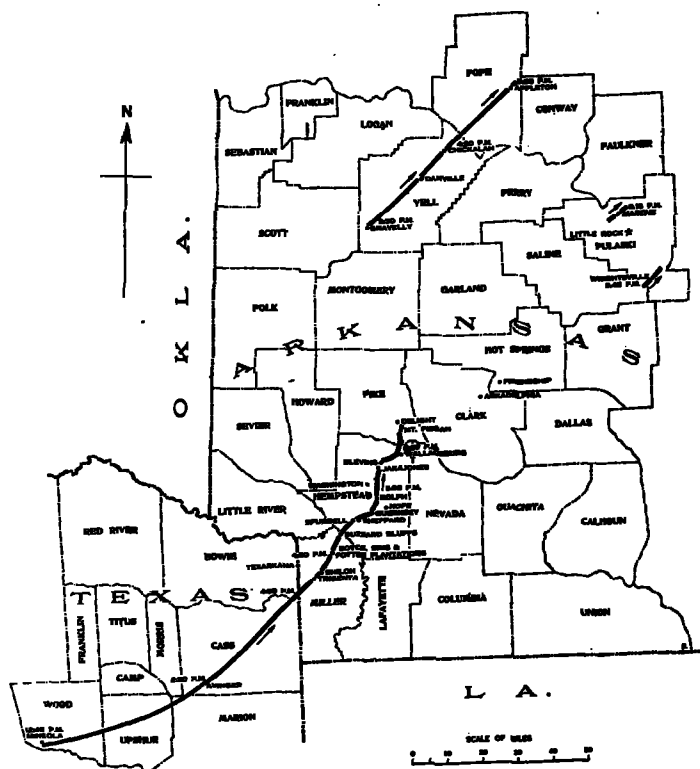


FIG. 1.—Map of northeast Texas and southwest Arkansas showing tracks of tornadoes, Apr. 15, 1921.

On the Boyce, Sims, and Potter plantations, about 3 miles further northeastward, farm buildings and Negro tenant houses were sucked from their moorings and deposited over the countryside, 10 people being killed. Moving on from these plantations the tornado crossed Red River into Hempstead County at Buzzards Bluff.





FIG. 3.—Home of A. J. Brooks on Prescott-Blevins highway, 4 miles south of Blevins, Ark., in which Brooks, his wife, and 11 children were imprisoned though none seriously injured; occupants lay on floor between two beds and the beds held walls off them.



FIG. 4.—Remains of Thebe Shackelford house, near Marlbrook church, carried 200 yards; scattered over a 15-acre field; 5 occupants killed.

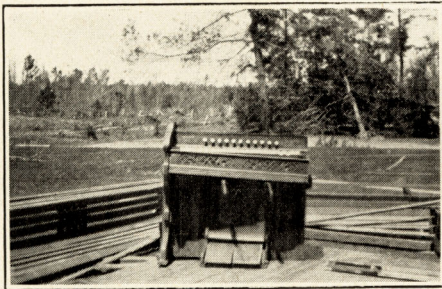


FIG. 2.—Remains of church near Blevins, Ark., after tornado of Apr. 15, 1921.



FIG. 6.—Ford car of Thebe Shackelford partially buried in the ground after having been blown 200 yards.

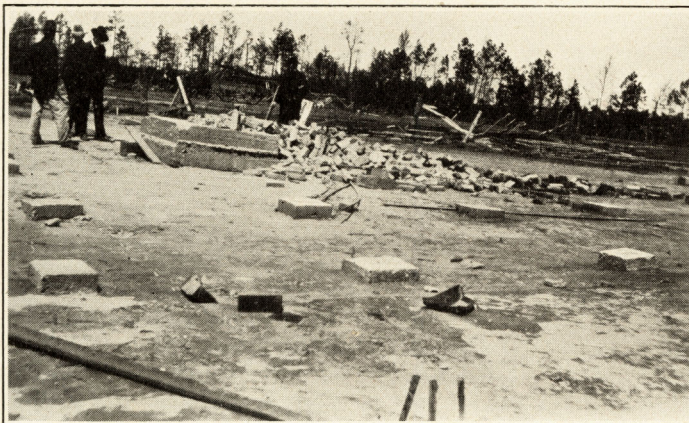


FIG. 5.—Concrete fireplace base, 3 by 6 feet, moved 3 feet by tornado (Thebe Shackelford house).



FIG. 7.—Remains of Cullen home near Blevins after tornado of Apr. 15, 1921.



Texarkana was visited during the period of the storm, about 30 minutes, by a heavy fall of rain and hail, the precipitation totaling 2.18 inches. Preceding the heaviest rainfall the air was filled with flying pieces of timber, leaves, and many other articles that had evidently been carried far from where they were first caught up. The occurrence of hail seems to have been confined principally to the west side of the storm, Columbus, Hempstead County, 11 miles northwest of the center of the track, reports that it was in the edge of the region where light hail fell, but that for a distance of 3 to 4 miles on the west side the hail was heavy. The storm was followed by a decided drop in temperature and a chilly night, so many of the injured, who were not found until the morning of the 16th, suffered from a night of exposure.

Along the Ninth Street road leading east from Texarkana, where there is a densely wooded area, massive oaks and pines were twisted off or uprooted and acres of tall trees were laid low, the destructive path through Miller County being about one-third of a mile in width.

Mr. W. S. Sims, a farmer living 10 miles east of Texarkana on the Dooley Ferry road, gives a graphic account of the tornado. He was near his home when he saw a great mass of leaves, timbers, and debris, flying high in the air, and in the distance a terrifying black funnel-shaped cloud moving toward him with a deafening roar. Rushing into his house and shouting to his wife and children to follow him, they ran to a creek about 300 yards distant and crawled under a heavy concrete bridge. A moment later the tornado was upon them and literally pulverized everything above ground in the vicinity. The home they had just left was blown into splinters, but in their place of retreat they escaped unharmed.

*Hempstead and Pike Counties.*—Leaving Buzzards Bluff and moving rapidly north and a little east to the Missouri Pacific track near Spurdell the storm followed the track by Sheppard, where four Negroes were killed, and on to Guernsey; then turning northward it cut a swath, varying in width from one-fourth to  $1\frac{1}{2}$  miles, through the center of Hempstead County. Water Creek Church, Dolph, Jackajones, Marlbrook, and the Wallaceburg communities of Hempstead County were the centers of its fury. Passing out of Hempstead County between sections 29 and 30, Tp. 9 S., R. 23 W., into Pike County, it next struck the Mount Pisgah settlement, near Delight, where 1 person was killed and 24 injured. After passing Pisgah the storm abated, and no further evidence of a twisting storm was found. Several places in Clark County report a "big blow," and at Friendship, just across the Clark County line in Hot Springs County, one home was completely wrecked and two people injured, but the indications are that there was no well-defined tornado. Arkadelphia, Clark County, reports that for several hours on the night of the 15th the atmosphere was kept light enough for reading, due to the incessant flashes of lightning.

The path of destruction through Hempstead County varied from one-fourth to  $1\frac{1}{2}$  miles in width, and in it, so far as can be learned, not a house is left standing. Heavy timbers, fences, and all outbuildings were swept before it.

Trees on the north limits of the path fell to the southeast, on the south limits to the northwest, in both cases falling toward the center of the storm path. In the central path of the storm the trees were broken sharply off at varying distances from the ground, only a few apparently blowing down, and these lying in the direction the storm traveled—that is, northeast. The central path of the storm looks like a forest subjected to shell fire.

Sheriff J. M. Dodson, of Hempstead County, was on the Nashville-Hope train en route to Little Rock with ten prisoners when the storm struck the train as it was pulling out from Dolph. Two cars loaded with cotton were blown from the track, the engineer and fireman were blown from the cab, and Engineer Mills declares that the locomotive was partially raised off of the track but settled back without damage. The passenger coach windows were riddled by hail, every house within sight was demolished, and trees 18 inches in diameter were twisted off at the base. No one in the immediate vicinity was killed. Sheriff Dodson described the storm as follows:

Our first indication of the approaching tornado was seen while we were at the station waiting for the train in Washington. The rain was coming down in a steady downpour. There was an occasional hailstone. It was lightning constantly, one flash following another so rapidly that it appeared to be one flickering sheet of light out in the west, and the thunder didn't let up for an instant. There wasn't even a suggestion of a breeze, but while we were watching, green leaves and small twigs began falling on the station platform. Someone remarked that there was wind high up, and that a storm was passing over.

After the train pulled out of Washington there seemed to be quite a glow over in the west, a glow which rapidly turned to red, like the red of a sunset. Persons around me remarked that it was clearing in the west, that the entire sky would soon be clear. It looked for the world like the clouds were breaking, and the rain had almost stopped.

But as we reached Dolph the clouds seemed to get heavier and darker, and within two or three minutes it became so dark in the coach that one could not see half way down the car. The train started slowly, and I remember I was wondering when the porter would light up, when my thoughts were interrupted by an immense piece of sheet tin slapping the side of the car. The crash combined with the roar of the wind and the train, but within the darkened coach there was no sign of panic. It was as though everybody was stricken with the shock.

It was not until several minutes later when the tornado had passed, and the passengers began piling out of the train, which had stopped when the two freight cars ahead had gone from the track, that the people got excited. Two Negro houses and a barn near the track had been demolished. A crowd of men, women, and children who had been rendered homeless were bunched together, some horrorstricken and quiet and some hysterical, but all too unnerved to begin immediately a search of the debris for possible dead or injured. It was several minutes before a systematic investigation could be started by the passengers and train crew.

Nobody was injured or killed in the houses. No stock was killed, and the mules were found standing just where they had been feeding, though the barn was blown away. The fireman sustained a wrenched back, but was able to continue his run. The engineer had managed to swing by a rod and to climb back into his cab and stop the engine before it had gone more than a short distance. The overturned box cars were clear of the track, and the train was able to resume its trip after a half-hour delay.

A quarter of a mile beyond Dolph the trees were erect, the houses were intact, and there was nothing to indicate that there had been a storm within a hundred miles.

The storm did a number of freakish tricks, some of which were the blowing of ten or a dozen rails from a fence, driving them into the ground and breaking them off, stripping one side of a tree of great limbs, leaving the other untouched, demolishing a church near Blevins, leaving only the organ and Bible (fig. 2). At the home of A. Trapp, 6 miles northwest of Hope, a savings bank was found near the ruins of the house in which there was \$4,000, and a large sum was also found on the farm of J. L. Atkins, neatly wrapped in a roll of paper and secured with a rubber band. There was one instance of a man and his family who were sitting on the porch of their home when the tornado struck them. The house was lifted from its foundation and dashed to pieces, but the porch, which was not strongly nailed to the house, remained intact. The family, when the crash came, looked around and saw their home disappear, but none of them had been injured. There were, however, many other freaks telling opposite stories, that is death and destruction to everything near.

Perhaps the greatest catastrophe occurring in Hempstead County was in the little village of Wallaceburg,

2 miles northeast of Blevins. It was here the Thebe Shackelford family lived. Their house was lifted clear of the yard fence and scattered over a 15-acre field (figs. 4 and 5). Furniture was completely destroyed, while the bodies of chickens dotted the ground in the vicinity of the house and barn. A 1920 model Ford car was blown a considerable distance and partially buried in the ground (fig. 6) and the bodies of Mr. and Mrs. Shackelford, two children, and a visitor, were found 100 yards beyond. This house had a concrete foundation, and a concrete base, 3 by 6 feet, on which the fireplace rested, was blown 3 feet from its original position (fig. 5).

Approximately 500 yards north of this scene the home of Mr. Taylor was demolished. Here another miracle was wrought. Mr. Taylor, a man of 80 years, his wife, and their son were the only occupants of the building. Mr. Taylor, a cripple, was unable to help himself. His wife held one door to the room in which they were while the son stood at another. All of the house was blown away with the exception of this room and parts of the porch. The barn close by was completely demolished and feed stuff scattered to the four winds. Several head of stock were killed. None of the three occupants of the house suffered any injuries.

In the A. J. Brooks residence, on the Prescott-Blevins highway 4 miles south of Blevins, Brooks, his wife, and 11 children were imprisoned, though none seriously hurt, when their home was completely demolished. Mr. Brooks says not more than two minutes of time elapsed from the time the tornado struck them until it was all over. (Fig. 3.)

A survey of the entire track in Arkansas which is about 70 miles in length, embracing Miller, Hempstead, and a portion of Pike Counties shows the following estimate of damage done and the number killed:

Miller County, killed 16, property damage \$175,000.

Hempstead County, killed 34, property damage \$1,000,000.

Pike County, killed 1, property damage \$50,000.

Table 1 gives information obtained at different points along the path.

*Yell-Pope County tornado.*—Starting at 3:30 p. m. another smaller and less destructive tornado, moving from the southwest toward the northeast over a path varying in width from 125 to 200 yards, struck Gravelly, Yell County, killing 1 person, injuring 15, and doing property damage estimated at \$50,000. Leaving Gravelly the storm rose and passed over Danville too high to do serious damage and struck Chicklah Mountain, which is 800 or 900 feet above the plain, at 4:20 p. m. The top of the mountain is 8 miles long and 2 miles wide and is a rich agricultural section producing large quantities of fruit and potatoes. While there were numerous dwellings demolished and crops were damaged the storm did not have a well-defined path in which everything was destroyed but was more of a straight blow. No further damage was found in Yell County, but continuing in a northeast course into Pope County,  $1\frac{1}{2}$  miles northwest of Appleton, further evidence of a tornado is seen. The storm struck here at 5:00 p. m., the path varying in width from 300 yards to one-half mile, the path of greatest destruction being about 200 yards wide. Here 4 people were killed, 6 injured, and property damage to the extent of \$10,000 sustained. No further account of damage by this tornado was received.

*The Marche tornado.*—At 8:18 p. m. on the evening of the 15th a tornado moving from southwest to northeast with a path about one-half mile wide struck Marche, a settlement about 10 miles northwest of Little Rock in Pulaski County. This tornado cut a swath about a mile in length through this settlement, completely destroying seven homes, killing considerable stock and injuring five people, the damage being estimated at \$10,000.

*Wrightsville tornado.*—At Wrightsville, 10 miles southeast of Little Rock in Pulaski County, another tornado with a funnel-shaped cloud, rotary winds, and a path one-quarter mile wide occurred about 8:45 p. m. April 15. This tornado was not so severe as the other three, the destructive path being only 300 feet wide. Damage estimated at \$2,500 was sustained, no injury or loss of life being reported.

Tornadoes, Apr. 15, 1921, Arkansas and Texas.

Place.	Time (p. m.).	Direction of movement.	Width of destructive path.	Clouds.	Winds.	Direction trees lay on—			Killed.	Injured.	Damage estimated.	Remarks.	Information furnished by—
						N. side.	Center.	S. side.					
Mineola, Wood County, Tex.	12:45	SW-NE...	100 feet....	Funnel shaped.	Rotary...	.....	.....	.....	.....	1	.....	2 houses destroyed, 6 houses damaged.	Postmaster, Mineola, Tex.
Avinger, Cass County, Tex.	2:50	From 37½° west of S towards 37½° east of N.	400 to 600 yards.	do.....	do.....	S.....	Twisted mass.	N.....	8	44	.....	22 landowners, 16 tenants suffered loss.	Mrs. J. L. Stephenson, secretary Avinger storm-relief committee.
Bowie County, Tex.....	3:30	SW-NE...	½ mile.....	do.....	do.....	SE.....	Generally NW.	NE.....	2	.....	.....	.....	Henry Humphrey, Four State Press, Texarkana, Ark.
Strip 25 miles in length through Miller County, Ark.	4:30	SW-NE...	½ mile.....	.....	Rotary, regular twister.	SE.....	NE.....	NW.....	16	50	\$150,000	Damage estimate does not include crop damage.	F. F. Quinn, secretary Red Cross Committee, Texarkana, Ark.
Strip through Hempstead County, about 40 miles.	5:00	SW-NE...	½ to 1½ miles.	.....	.....	NE.....	NE.....	NE.....	100	.....	1,000,000	Most destructive have ever seen results from.	N. P. O'Neal, Hope, Ark.
2½ to 3 miles southeast of Washington, Hempstead County.	5:00	SW-NE...	do.....	.....	.....	(*)	(*)	(*)	7	30	30,000	Everything in path destroyed.	Rosa Wallace, postmistress, Washington, Ark.
11 miles southeast of Columbus, Hempstead County, Ark.	5:00	SW-NE...	½ mile.....	.....	.....	SE.....	All directions.	NW.....	.....	.....	.....	Heavy hail 3 to 4 miles on west side; light hail at Columbus; barometer at Columbus fell 0.10.	R. C. Stuart, Columbus, Ark.
1½ miles east of Blevins, Hempstead County.	5:20	SW-NE...	½ to 1½ miles.	Funnel shaped.	Rotary...	SE.....	do.....	NW.....	9	34	\$200,000	57 residences destroyed, 75 residences damaged, 41 barns destroyed.	W. O. Beene, Blevins, Ark.
Mount Pisgah, Pike County.	.....	S-NE.....	½ mile.....	.....	.....	(*)	(*)	(*)	1	24	50,000	.....	H. W. Guise, postmaster, Delight, Ark.
Pike City, Pike County	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	H. M. Lintz, Pike, Ark.
Gravelly, Yell County..	3:30	SW-NE...	125 yards..	.....	.....	S-SW.	NE.....	NE.....	1	15	50,000	.....	Thos. B. Frizzell, postmaster, Gravelly, Ark.
Danville, Yell County	4:20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Newspaper reporter. Do.
Chickiah Mountain, Yell County.	5:00	SW-NE...	200 yards..	.....	Straight blow.	(*)	(*)	(*)	4	6	.....	Considerable damage.	J. A. Jones.
1½ miles northwest of Appleton, Pope County.	8:18	SW-NE...	.....	.....	.....	.....	.....	.....	.....	5	.....	7 homes destroyed, stock killed.	Max Malschowski.
Marche, Pulaski County.	8:45	SW-NE...	300 feet....	Funnel shaped.	Rotary...	.....	.....	.....	.....	.....	2,500	Buildings damaged.	J. C. Cook.

<sup>1</sup> About.<sup>2</sup> Every direction.<sup>3</sup> \$25,000 crops.<sup>4</sup> All directions.<sup>5</sup> No storm; clouds black, heavy rain; leaves, etc., scattered through vicinity.<sup>6</sup> Storm passed over too high to do damage.

## LOCAL STORMS IN MISSISSIPPI.

By R. T. LINDLEY, Meteorologist.

[Weather Bureau, Vicksburg, Miss., June 6, 1921.]

Violent local storms traversed portions of seven counties of Mississippi during the night of April 15-16 or on April 16. On account of the storms occurring during the night, mostly, funnel-shaped clouds, characteristic of the tornado, were not observable, although the destruction wrought, the accompanying sounds, and the directions in which debris were scattered gives basis for the belief that some, if not all, the storms may have been true tornadoes.

One, on the night of the 15th-16th, passed over a portion of the course laid waste by the tornado of March 16, 1919, from near Grace, Issaquena County, to the vicinity of Pantherburn, in Sharkey County, with heavy resultant damage, but, fortunately, without loss of human life. One person was killed and 10 were injured in portions of Noxubee and Lowndes Counties during the early morning of the 16th, and considerable damage was done, at about the same time, without loss of human life, near Hazlehurst, Copiah County. On April 16, 1 person was killed and 15 were injured by a violent local storm, characterized by observers as a tornado, in the southwestern portion of Kemper County, in the vicinity of Rio. Also, at about the same time, extensive prop-

erty damage resulted, with injuries to 10 persons, from the occurrence of a local storm in the vicinity of the New Zion settlement, in the eastern portion of Amite County.

Three local storms, doing considerable damage, occurred on the afternoon of April 26. Two, affecting portions of Copiah and Lincoln Counties, were of relatively slight importance, but the third practically demolished Braxton, a town of about 300 population, in Simpson County, leaving but two buildings standing, causing the death of 15 persons and serious injuries to 23. From all accounts this storm was of true tornado type.

551.515 (761) —

THE TORNADOES OF APRIL 16, 1921, IN ALABAMA.<sup>1</sup>

By P. H. SMYTH, Meteorologist, and J. W. SMITH, Observer.

## WEATHER CONDITIONS AT 7 A. M.

A disturbance of considerable intensity centered in the middle Mississippi Valley, with a comparatively wide trough of low pressure extending southward to the Gulf of Mexico. A marked temperature gradient existed between Cairo, Ill., and Columbia, Mo., and freezing ex-

<sup>1</sup> Full details of these storm have been compiled and are on file at the offices of the U. S. Weather Bureau, Washington, D. C., and Montgomery, Ala.